MISSOURI DEPARTMENT OF TRANSPORTATION
MATERIALS ENGINEERING
JEFFERSON CITY, MISSOURI

TEST METHOD
MoDOT T49
PULL-OUT TESTS ON CHEMICAL BONDING AGENTS

1.0 SCOPE

1.1 This test method covers the procedure for determining the total load in pounds required to cause failure of chemical bonding agents for use in anchoring threaded rod, deformed reinforcement, or smooth epoxy coated dowel bars.

2.0 Concrete Cylinder and Anchored Product Requirements.

2.1 Concrete Cylinders. Two concrete cylinders (6 x 12 inches) for each bonding agent shall be prepared using a limestone coarse aggregate and moist cured for at least 28 days. Representative cylinders will be tested and must obtain a minimum strength of 6000 psi.

2.2 Deformed reinforcement will have a tensile strength as designated in the manufacturer certifications. The size will be as used in the manufacturer certifications and will be a minimum of 24" in length. If no size is designated, use M16(#5) deformed rebar, 3/4" hole, 9" deep.

2..3 Epoxy Coated Dowel Bars. Epoxy coated dowel bars shall be one inch in diameter and having a length of 24 inches and shall be grade 60 and comply with MoDOT Standard Specifications.

2.4 Threaded rod will be long enough to provide a minimum of a 2" protrusion after insertion into the manufacturer's recommended hole depth. The diameter will be as used in the manufacturer certifications. If no size is designated, use 1/2" threaded rod, 5/8" hole, 9" deep or 5/8" threaded rod, 3/4" hole, 9" deep.

3.0 PROCEDURE

3.1 The holes drilled in the concrete cylinders will be to the diameter and depth as stated below.

Threaded Rod	As specified by manufacturer
Deformed Reinforcement	As specified by manufacturer
Epoxy Coated Smooth Dowel Bars	1 1/8" Diameter, 9" Depth

The holes will be clean and blown dry prior to inserting the bonding agent.

3.2 The inserting of the bonding agent will begin with positioning the cylinder with the hole in a horizontal position (Note 1). Insert the bonding agent to the rear of the hole in an amount to completely fill the cavity when the dowel is inserted. Insert the anchored product with a twisting motion sufficient for one full revolution. The cylinder is to remain in the horizontal position until curing is complete.

NOTE If bulk material is furnished without a mixing tube, the bonding agent may be placed in the hole with the cylinder in a vertical position. The cylinder shall then immediately be placed in a horizontal position and the anchored product inserted.

All mixing and placing of the bonding agent will be in accordance with the manufacturer's recommendations. Two test specimens will be tested for each bonding agent and style of anchored product.

3.3 The test shall be performed when the bonding agent has cured for 2 hours or at the manufacturer's specified cure time, whichever is less. The anchored product shall then be pulled from the concrete cylinder at the rate of 0.5 inches per minute.

4.0 REPORT.

4.1 The report shall indicate for each test specimen the load in pounds required to cause failure of the system, the average of the two test specimen loads, a description of the failure for each specimen, and cure time when tested.